

CORRECTION

EXERCICE n°21 :

a. $f(x) = \left(x + \frac{1}{2}\right) \ln(2x+1) - x \quad \text{sur} \quad \left] -\frac{1}{2}; +\infty \right[:$

$$f'(x) = 1 \times \ln(2x+1) + \left(x + \frac{1}{2}\right) \times \frac{2}{2x+1} - 1 = \ln(2x+1) + \left(\frac{2x+1}{2}\right) \times \frac{2}{2x+1} - 1$$

$$f'(x) = \ln(2x+1).$$

b. $f(x) = \frac{x^2-1}{2} \ln(x+1) - \frac{x^2}{4} - \frac{x}{2} \quad \text{sur} \quad]-1; +\infty[:$

$$f'(x) = x \ln(x+1) + \frac{x^2-1}{2} \times \frac{1}{x+1} - \frac{x}{2} - \frac{1}{2}$$

$$f'(x) = x \ln(x+1) + \frac{x-1}{2} \times \left(\frac{x+1}{2}\right)$$

$$f'(x) = x \ln(x+1) - 1.$$

c. $f(x) = \ln\left(\frac{2x+1}{1-x}\right) \quad \text{sur} \quad \left] -\frac{1}{2}; 1 \right[:$

$$f'(x) = \frac{2(1-x) - (2x+1) \times (-1)}{(1-x)^2} = \frac{3}{(1-x)^2} = \frac{3}{(1-x)^2} \times \frac{1-x}{2x+1}$$

$$f'(x) = \frac{3}{(1-x)(2x+1)}.$$

d. $f(x) = x^2 - 3x + 5 \ln(3x+4) \quad \text{sur} \quad \left] -\frac{4}{3}; +\infty \right[:$

$$f'(x) = 2x - 3 + 5 \times \frac{3}{3x+4} = \frac{(2x-3)(3x+4) + 15}{3x+4} = \frac{6x^2 - x + 3}{3x+4}.$$

e. $f(x) = 2 \ln(1+2x) - 3 \ln(3x+2) \quad \text{sur} \quad \left] -\frac{1}{2}; +\infty \right[:$

$$f'(x) = 2 \times \frac{2}{1+2x} - 3 \times \frac{3}{3x+2} = \frac{4}{1+2x} - \frac{9}{3x+2} = \frac{4(3x+2) - 9(1+2x)}{(1+2x)(3x+2)}$$

$$f'(x) = -\frac{6x+1}{(1+2x)(3x+2)}.$$